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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,299	09/15/2003	Haichao Liu	02307V-139100US	2611

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EXAMINER
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PUTTLITZ, KARL J

ART UNIT	PAPER NUMBER
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1621

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/12/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/663,299

Applicant(s)

LIU ET AL.

Examiner

Karl J. Puttlitz

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 29-67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/29/2006</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

The examiner reminds Applicant of Applicant's election of Group I, claims 1-28 in the reply filed on 11/18/2005. Claims 29-67 remain withdrawn from consideration.

### ***Specification***

Applicant still is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet .

The rejection under section 112, second paragraph is withdrawn since the steps of the process need not identify a product. The following new grounds of rejection are now entered.

The prior art rejections are maintained and repeated below:

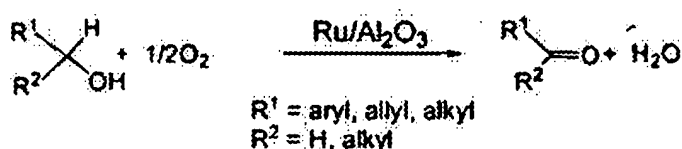
### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 6, 8, 11, 12, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al., Supported Ruthenium Catalyst for the Heterogeneous Oxidation of Alcohols with Molecular Oxygen, *Angew. Chem. Int.* 2002, 41, No. 23, pp. 4538-4542 (Yamaguchi).

Yamaguchi teaches the following reaction at page 4538, left column:



The difference between the process covered by the rejected claims and the process disclosed by Yamaguchi is that Yamaguchi fails to explicitly teach the oxidation of methanol or ethanol. However, given the above formula, Yamaguchi suggest methanol and ethanol with the requisite particularity such that oxidation of these starting materials would be well within the motivation of those of ordinary skill, and thus, prima facie obvious.

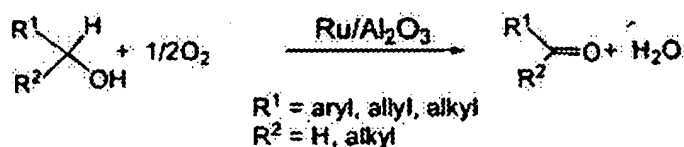
Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi in view of Tanaka et al., *Chemistry Letters* (1994), (4), 809-12, Chemical Abstracts online citation [retrieved 19 April 2006] on CAPLUS on STN, Columbus OH, USA, Accession No. 1994:422227 (Tanaka).

Claim 7 covers those embodiments wherein the process comprises oxidation of ethanol to produce primarily diethoxyethane. Yamaguchi fails to explicitly teach this requirement. However, it is on this proposition the examiner joins Tanaka. Specifically

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Tanaka demonstrates that diethoxyethane is a primary product of ethanol oxidation using supported catalysts. Therefore, the requirement that diethoxyethane be produced by the oxidation of ethanol is well within the motivation of those of ordinary skill, and thus, *prima facie* obvious.

Applicant argues that Yamaguchi fails to teach oxidation of methanol or ethanol. However, the following reaction disclosed by Yamaguchi is suggestive of ethanol and methanol:



Claims 1-6, 9-13, 16-20, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 65123 (JP 123) in view of Mallat et al., Oxidation of alcohols with molecular oxygen on platinum metal catalysts in aqueous solution, *Catalysis Today*, 19 (1994) 247-284 (Mallat).

With regard to the above embodiments, JP 8123 teaches a process for the oxidation of methanol with oxygen over a catalyst comprising iridium and rhodium and a proton conductor, which produces methyl formate, formaldehyde, and dimethoxymethane, see attached abstract from JPO [retrieved on 11 April 2006] in EAST.

The difference between the process covered in the rejected claims and the process disclose in JP 123 is that the patent fails to disclose that the catalysts are supported including a reducible metal oxide or a mixture of such oxides. It is for this proposition, however, that the examiner joins Mallat. Specifically, this reference teaches oxidation of simple alcohols, for example, at page 250. The catalyst may be composed of active metal, promoter, and support, see page 249, which can include palladium (see claim 25). Such promoters include tin, which is oxidized to stannic oxide, see page 250. At page 273, the reference schematically depicts the surface of the catalyst, as required by claims 9 and 10:

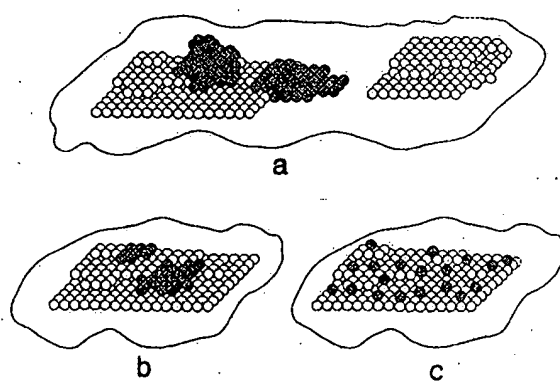


Fig. 6. Schematic representation of promoter (black) deposition on Pt metal (white) particles: (a) bulk (metallic) crystallite on the platinum metal or on the support. (b) adatoms in clusters. (c) isolated adatoms.

The supports include, for example, alumina and silica, see page 250. With regard to the recited temperatures, these process conditions are held to be within the

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motivation of those of ordinary skill in order to optimize the reaction, see M.P.E.P. § 2144.05 ("Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)").

Based on the foregoing, those of ordinary skill would have been motivated to modify JP 123 to include the required supports including a reducible metal oxide or a mixture of such oxides, since Mallat teaches, by way of a review of the art, that these catalyst structures are routine and advantageous in the art of alcohol oxidation, (The strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. *In re Sernaker*, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983). See M.P.E.P. § 2144. Accordingly, the rejected claims are prima facie obvious since the combination of JP 123 and Mallat teaches the elements of these claims with a reasonable expectation of success.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 123 in view of Mallat as applied to claims 1 and 11 above, and further in view of

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Kirk-Othmer Encyclopedia of Chemical Technology Copyright © 2002 by John Wiley & Sons, Inc., pp. 200-254 (Kirk Othmer).

Claims 14 and 15 cover those embodiments wherein the support comprises zirconia and titania. Neither JP 124 nor Mallat explicitly teach these requirements of the claimed invention. It is for this proposition, however, that the examiner joins Kirk Othmer. Specifically, Kirk Othmer teaches that common catalyst supports include zeolites, see, for example, page 227. Those of ordinary skill would therefore be motivated to modify JP 123 and Mallat to include zeolites such as zirconia and titania since these zeolites are routine catalyst supports, as evidenced by Kirk Othmer. Therefore, claims 14 and 15 are prima facie obvious since the combination of JP 123, Mallat and Kirk Othmer teaches the elements of these claims with a reasonable expectation of success.

Applicant argues that JP 123 is not suggestive of the required metal oxides. However, the use of oxides in catalysts is generally known to those of ordinary skill, and JP 123 merely reflects this by listing the commonly used oxides. There is no objective evidence that using the commonly known oxide would provide an unexpected benefit.

The following new ground of rejection is now entered:



***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al., Huanjing Kexue Xuebao (1987), 7(3), 297-304, 384.

Lin teaches oxidation of methanol over platinum metal catalysts to produce formaldehyde and methyl formate. See attached CAS online citation on STN, Columbus OH, USA.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-0645. The examiner can normally be reached on Monday to Friday from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman K. Page, can be reached at telephone number (571) 272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).



Karl J. Puttlitz  
*Assistant Examiner*